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4 **ENERGY FACILITY SITE EVALUATION COUNCIL**

5 In the Matter of  
6 Application No. 96-1,

7 OLYMPIC PIPE LINE COMPANY  
8 CROSS CASCADE PIPELINE  
9 PROJECT.

**NO.**

**PREFILED TESTIMONY OF :  
SARAH S. COOKE**

**ISSUE: WETLANDS**

**SPONSOR: COUNSEL FOR THE  
ENVIRONMENT**

11  
12 **Q. Please state your name and employment position.**

13 **A.** My name is Sarah Cooke. I am the owner and senior scientist of Cooke Scientific  
14 Services. My business address is 4231 NE 110<sup>th</sup> St, Seattle, WA 98125.  
15

16 **Q. What is your educational background?**

17 **A.**  
18 • Ph.D., University of Washington. 1994. Dissertation title: The Edaphic Ecology of  
19 Two Northwest American Composite Species.  
20 • M.S., Plant Taxonomy, University of Washington, 1987.  
21 • Honors Degree, Geobotany, McGill University, 1979.  
22 • B.S., Biology and Geology, McGill University, 1979.

23 **Q. What is your employment history?**

24 **A.**  
25 • Owner, Cooke Scientific Services, Inc. Seattle, Washington. Senior Scientist and  
26 owner of company. 1995 to present.

- Instructor, Wetland Plants of the Pacific Northwest, Portland State University, Portland, Oregon. Spring 1998.
- Principal Scientist, wetlands group, Pentec Environmental Inc., Edmonds, Washington. 1990-1995.
- Instructor, University of Washington, Extension Services, Wetland Certification Program. Wetland Science and Ecological Processes. 1994-1995.
- Instructor, University of Washington, Extension Services, Wetlands Flora of Western Washington. 1990-1996.
- Long-term Research Co-manager, Puget Sound Wetlands and Stormwater Management Research Program. 1987-1996.
- Researcher, University of Washington/King County Cooperative Unit, Long-term Research Program Project. 1987-1996.
- Project Coordinator, Senior Editor and Author. US Environmental Protection Agency/Washington Native Plant Society. 1992-1997.
- Instructor, Washington State Department of Ecology, Wetland and Riparian Restoration, a workshop for agency staff and consultants. 1993.
- Co-instructor, Hydric Soils Workshop. University of Washington Center for Urban Horticulture, College of Forest Resources. 1992.
- Instructor, Hydric Soils, Processes and Characteristics. University of Washington Extension Services. 1992.
- Co-instructor, Wetlands Ecology. The Evergreen State College, Masters of Environmental Science. 1991.
- Instructor, Interagency Wetlands Delineation Agency Training/USACOE, EPA, SCS, and US Fish, and Wildlife Service. 1987 and 1989.
- Field Biologist/Soil Scientist, King County Wetlands Inventory. 1990.
- Professional Botanist, Washington Native Plant Society. 1989.
- Senior Wetlands Ecologist, Shapiro and Associates. 1988.
- Botany and Soils Consultant and Subcontractor, Raedeke Associates. 1986-1987.
- Team Member, Cedar River Watershed Long-term Wetlands Monitoring Project, Seattle City Light. 1988.

Further details are included in the appendix to my testimony, Exh. SSC-1

1 **Q. What topics is your testimony intended to cover?**

2 **A.** First, I will explain the types of services that Cooke Scientific Services provides.

3 Second, I will describe the range of projects that I have worked on.

4 Third, I will discuss the approach that I use in advising clients with projects that have the  
5 potential to impact wetlands.

6 Fourth, I will assess the applicant's evaluation of the potential impacts to wetlands of the  
7 Cross Cascade Pipeline.

8 Fifth, I will discuss additional mitigation measures that should be required if the pipeline is  
9 sited.

10 Finally, I will discuss the availability of alternative routes to reduce impacts to wetlands.  
11

12 **Q. What type of services does Cooke Scientific Services offer?**

13 **A.** Cooke Scientific Services (CSS) is a WBE-certified consulting firm located in the Puget  
14 Sound area of Washington. I founded the firm in 1995.

15 CSS provides wetland and stream mitigation, wetland delineation, wetland and stream  
16 characterization, wetland monitoring, and associated documentation. CSS also provides  
17 environmental-related project assistance for mine reclamation projects and watershed  
18 assessments. CSS staff members are highly experienced with permitting on local, state, and  
19 federal levels. Clients have included public agencies, private businesses, private developers,  
20 educational institutions, Indian tribes, utilities, and commercial companies.

21 Specific service areas include the following:

- 22 • Wetland mitigation planning, design, and installation management
- 23 • Wetland and stream inventory
- 24 • Wetland delineation
- 25 • Functional assessments using any methodology
- 26 • Mitigation monitoring

- Watershed analysis – surface erosion, mass wasting, hydrology, water supply/public works
- Vegetation and soils mapping and characterization
- Rare plant surveys
- Mine reclamation ecology (re-vegetation and slope stabilization)
- Impact assessment
- Permitting and regulatory assistance
- Expert witness testimony
- SEPA/NEPA/EIS document production
- Pure and applied research on vegetation and soils
- Peer review of wetland delineations, mitigation plans, and monitoring projects
- Wetland education

**Q. Will you give examples of the range of projects that you and your company have worked on?**

**A.** Bellingham Airport, Port of Bellingham. Wetlands and stream functional inventory, mitigation site selection, wetlands and stream impact assessment, mitigation plan design, and technical advisor for the mitigation banking agreement for the development of the mitigation banking agreement. 1997-present.

Hoh Indian Tribe, Forks, Washington. Wetland inventory for Middle Hoh River watershed analysis, including aerial photo interpretation, ground-truthing, plant identification, producing maps, and wetland functional assessment. 1998.

City of Renton, Pipeline Project. Wetlands and stream delineation, mitigation design and permitting assistance for a pipeline crossing of the Cedar River. 1996-present.

1 Home Depot, Bothell, Washington. Coordinated the wetlands permitting and a detailed  
2 hydrologic monitoring, wetland delineation, and mitigation (enhancement and creation) for the  
3 Home Depot planned development in Bothell, Washington. 1993-1995.

4 These services have been provided to a wide-range of clients including: port districts,  
5 tribes, private corporations, cities, counties, and state agencies. For a detailed list see the appendix  
6 to my testimony, Exh. SSC-1.

7  
8 **Q. In general, how did you develop the testimony you are presenting to the Council?**

9 **A.** I reviewed documents including Olympic's Application and Revised Application, the  
10 Wetlands Report, and the draft environmental impact statement; consulted with other  
11 professionals, examined the pipeline route from Snohomish County to the terminus, and worked as  
12 part of the NRC team. I have also reviewed some of the comments on the DEIS and portions of  
13 the depositions of Katy Chaney and David Every. (All page references in my testimony to "the  
14 Application" are to the Revised Application.)

15  
16 **Q. Have you observed the proposed route of the pipeline?**

17 **A.** Yes. On October 21 and 22, 1997, I toured by car the proposed route of the Cross-Cascade  
18 Pipeline. I accompanied other members of the Natural Resource Consultants, Inc., (NRC) team  
19 retained by Counsel for the Environment to review the proposal by OPL. Prior to departure, the  
20 NRC team identified the pipeline route and key areas of concern on maps, along with specific  
21 natural resources or geological features the team intended to evaluate on a site-by-site basis. The  
22 team investigated 27 sites during the two-day tour and took still photographs and videos at most of  
23 the sites. The team's impressions of each site were recorded.

1 **Q. What functions do wetlands perform that make them a valuable natural resource?**

2 **A.** Wetlands play important roles providing valuable benefits to the landscapes in which they  
3 exist. Each wetland serves some function that has some benefit, although specifics vary from  
4 wetland to wetland. Understanding and identifying these benefits and roles is currently limited to  
5 qualitative and semi-qualitative judgments and knowledge of potential functions and their benefits.  
6 Wetland functions and values identified by many sources (Adamus et al. 1987, Mitsch and  
7 Gosselink 1986, Sather and Smith 1984, and Reppert et al. 1979) include the following:

- 8 • hydrologic support
- 9 • storm- and floodwater attenuation
- 10 • flood peak desynchronization
- 11 • sediment stabilization and erosion control
- 12 • water quality improvement through biofiltration and retention of sediments, nutrients,  
13 and toxicants
- 14 • high primary productivity
- 15 • accumulation of organic material
- 16 • important nutrient cycling and utilization
- 17 • food chain support
- 18 • habitat diversity for fish and wildlife
- 19 • refuge for threatened, endangered, and sensitive species

20  
21 **Q. When a client retains you to evaluate a development project which will involve one or**  
22 **more wetland areas, what steps do you take to prevent or reduce impacts to the wetland(s)**  
23 **from the proposed development?**

24 **A.** The first step in evaluating potential impacts to a project is to perform a thorough site  
25 evaluation. Site-specific aerial photographs, geologic maps, topographic maps, and soil maps are  
26 evaluated in order to determine the location of potential wetland and stream areas. Field

1 evaluations occur for each site that looks as though it may potentially contain wetlands. Most  
2 agencies (local, state and federal) require a wetland boundary survey. We therefore flag the  
3 wetland boundary using criteria identified in the following manuals: *Corps of Engineers Wetland*  
4 *Delineation Manual* (Environmental Laboratory 1987. Technical Report Y-87-1, U.S. Army Corps  
5 of Engineers Waterways Experimental Station, Vicksburg, Mississippi) and the *Washington State*  
6 *Department of Ecology Wetlands Identification and Delineation Manual*. (Washington State  
7 Department of Ecology. 1997. Washington State Department of Ecology Publication #96-94.  
8 Washington State Department of Ecology, Olympia, Washington). A survey is made of the  
9 wetland flags to determine the exact extent of the wetlands. Wetland functions are determined for  
10 each wetland identified; using an agency accepted protocol.

11       Once sensitive areas are identified project layouts are determined in order to minimize  
12 impacts to wetlands and streams. Project components can often be moved or redesigned to move  
13 them out of the way of sensitive areas. If project constraints mean that wetlands or streams must  
14 be impacted, then wetland and stream mitigation is developed to compensate for those impacts.  
15 Mitigation includes restoration of areas that are to be only temporarily impacted, enhancement of  
16 existing areas, and creation of additional wetland area from non-wetland terrain. If more than 1.99  
17 acres is to be impacted (either temporarily or permanently) and the project does not fall under an  
18 existing Clean Water Act Section 404b Nationwide permit, then an individual permit is required.  
19 A Corps-style Alternative Analysis must, therefore, be prepared that shows there are no other  
20 alignments or locations where the project can fall that cause less impacts to wetlands and streams.  
21 If the project proponent fails to provide a convincing argument for the selected alignment, then the  
22 individual permit fails.

23       If the project is granted permits (Section 404b, 401 Water Quality Permit, Hydraulic Project  
24 Approval, and local jurisdiction permits such as grading and building), then a detailed mitigation  
25 plan and report is developed including a site-by-site specific planting plan for restoration,  
26 enhancement, and creation, including numbers of plants, their size and the location for installation.

1 The report includes a monitoring and maintenance schedule and detailed plans. A contingency  
2 section is always required in which potential problems are anticipated and compensatory measures  
3 are suggested before problems arise.

4  
5 **Q. Has Olympic taken adequate pre-project steps to prevent or reduce impacts to**  
6 **wetlands?**

7 A. No. Olympic has not completed a comprehensive field evaluation and has not conducted a  
8 boundary survey of the wetlands it has identified. Olympic has not determined wetland functions  
9 for each identified wetland using an agency accepted protocol. Of perhaps the greatest  
10 significance, Olympic has not shown that there are no other alignments or locations for the project  
11 that would cause less impact to wetlands and streams. King County has provided an alternative  
12 route that reduces impacts to wetlands and streams within that County. King County Comments on  
13 DEIS, pp. 19-31, Exh. SSC-3. To my knowledge, Olympic has not provided any information on  
14 the suggested route changes.

15  
16 **Q. In your opinion, has OPL adequately characterized impacts to wetlands from**  
17 **construction and operation of the Cross-Cascade Pipeline?**

18 A. No. According to the Application, 134 wetlands are within 200 feet of the pipeline  
19 corridor. The Application identifies that the pipeline will cross 78 of these wetlands. (Olympic  
20 states that it has rerouted a portion of the pipeline and eliminated one wetland from direct crossing.  
21 (Olympic Pipeline Company's comments on DEIS, p. 12.)) The Applicant admits that the pipeline  
22 will indirectly impact 1,000 acres of wetlands and buffers. (Application, p. 1.4-20). Yet the  
23 Applicant expresses the total impact from the pipeline as only those acres of wetlands that will  
24 sustain direct construction impacts within the 30-foot construction corridor. This reduces the  
25 assessed impact to 16.48 acres. (It is my understanding that with OPL's recent route change, this  
26 number has been further reduced to approximately 15 acres.) The 30-foot footprint would result

1 in considerably more than 16.48 acres of impact because 1000 acres of wetlands are located within  
2 the 200-foot project zone. Limiting the total impacts to wetlands to the acreage directly impacted  
3 by project construction ignores (1) impacts to wetland functions, (2) indirect impacts from  
4 construction and operation, and (3) direct impacts from spills during operation.

5       Additionally, the Application fails to discuss the potential for the presence of wetlands and  
6 riparian corridors not identified during the wetland reconnaissance. The pipeline section between  
7 North Bend and Cle Elum was field-verified (in the fall of 1998) by the botanist George Wooten.  
8 Twenty additional wetlands were identified, many of the wetland boundaries previously identified  
9 were expanded, and 20 additional riparian areas were identified, 16 of which were located along  
10 Lake Kachees. (George Wooten, Pers. Comm.) If these findings are extrapolated for the length of  
11 the pipeline, with more additional wetlands west of the pass and fewer additional wetlands east of  
12 the pass, then even the limited estimate of 15-acres of direct impact is obviously inaccurate.

13       Olympic has not evaluated water quality impacts to wetlands during construction.  
14 Mitigation measures and Best Management Practices (BMPs) are proposed and described in  
15 various documents, but the documents lack a description of how they will be effectively  
16 implemented, particularly as physical conditions change along the corridor. The documents do not  
17 address how the BMPs will be employed consistently, given that the pipeline will be constructed  
18 by different crews at 3 separate locations. How will consistent oversight be provided?

19       The discussion does not address impacts to the vegetation communities, but rather how  
20 vegetation loss in impact areas affects the wildlife. There is very little discussion of the  
21 consequences of clearing and grading to the wetlands themselves, even if the areas are to be  
22 restored. Additionally, there is no discussion of the individual wetland functions, except for  
23 habitat. The Application also states that "...wetlands will be further avoided during final  
24 alignment design whenever feasible." (Application, p. 3.4-31.) One can only wonder if the final  
25 alignment design could also potentially increase wetland impacts. What are the unknown variables  
26 that can change when the final alignment is completed?

None of the analyses that OPL prepared for this project include a quantitative evaluation of all impacts. Downstream impacts to wetlands resulting from re-routing of drainage, springs, streams, and seeps are potentially high for some stretches of the pipeline. No discussion is made of this impact. Any wetlands near the pipeline route should be assessed with respect to both surface drainage and shallow ground water hydrology connectivity. Interruption of either surface flows or shallow groundwater flows could cause a change in the hydrologic regime the wetland has experienced over time. This change could, in turn cause changes to the vegetation community and, as a consequence, the wildlife.

Indirect impacts could occur even though the pipeline route will follow existing right-of-way corridors. Additionally, the impact acreage discussed is only for those areas directly in the path of the pipeline and does not take into consideration the acreage for areas that are going to be "restored" after the pipeline is laid.

The DEIS and supporting technical documents evaluate direct impacts to wetlands, but lack detail on indirect impacts, such as fragmentation of wetlands and cumulative effects. They neither evaluate the amount of wetland buffer that will be affected, nor provide mitigation for loss of wetland buffers.

The statement in the Application that "little to no water quality impacts" are expected as a result of the project, indicates an inherent lack of understanding of sedimentation and water quality issues. (Application, p. S-9.) A corridor 227 miles long and 60 feet wide will be disturbed. There are 1000 acres of wetlands within 200 feet of the pipeline route, which will be prime recipients for sediments liberated during construction. It is highly likely that some sedimentation will enter wetlands and streams, even if construction is restricted to dry periods.

**Why is it important to evaluate the potential impacts from the pipeline to wetland functions?**

The ability of a wetland to perform the functions listed above varies more than current

1 technology has the capacity to measure quantitatively. There is no set formula for assigning  
2 functional performance based on wetland types (forested, scrub-shrub, and emergent wetlands),  
3 wetland acreage, wetland age, vegetation community composition, basin configuration, or  
4 superficial hydrologic regime. No two wetlands are alike and no two wetlands perform the same  
5 functions at the same level no matter how similar they may be in size or vegetation community.  
6 Replacement of wetland losses on an acre-by-acre basis completely disregards individual  
7 characteristics encountered in a wetland and can result in much larger wetland functional losses  
8 than if the wetland is evaluated on a functional basis and mitigation is designed to replace lost  
9 wetland functions. In recognition of this fact, very few jurisdictions (local state or federal) still  
10 look at wetland impacts on an acre-by-acre replacement.  
11

Q.

12 **How is a wetland function and values analysis conducted?**

13 A. Functional assessments are performed in the field by examining field indicators for each  
14 function. A field assessment includes circumnavigation of the wetland to look for inlet, outlet, and  
15 drainage features, wildlife features (snags and downed logs), adjacent land use, wetland  
16 topography, vegetation community changes, and buffer characteristics. Field indicators are  
17 obvious features of the wetland that can be measured directly or identified on a presence/absence  
18 basis. An example of a field indicator is counting the number, size, and degree of decay of snags  
19 and downed logs as an indicator for the potential for amphibian and bird habitat. Functional  
20 Assessments that are the most useful require that field data on the characteristics of the wetland (as  
21 scored by the indicators) are compared to the scores from reference sites that have previously been  
22 evaluated to determine the highest and lowest level of performance of that function in wetlands  
23 located in the region.

24 Many functional evaluation protocols are available for functional assessments, and all are  
25 useful to some extent in modeling the characteristics present in a wetland that are responsible for  
26 the functional performance. These include WET (Adamus and Stockwell 1983, Adamus et al.

1 1987) and the Reppert Method (Reppert et al. 1979). However, the most scientifically accurate and  
2 useful method is the new Washington State Department of Ecology's Functional Assessment  
3 Methodology (WASFAM, Ecology 1998).

4  
Q. 5 **Is it valid to base the estimated risk of impacts to wetlands from the pipeline on the**  
6 **assumptions that the project will be constructed as anticipated and all prevention measures**  
7 **will work?**

8 A. No. Never in all the years that I have been doing wetlands assessments and mitigation has  
9 a project been implemented exactly as it was designed. This happens on all size projects, even  
10 where there has been a very thorough site evaluation. Site conditions can, and often do, vary from  
11 what is anticipated. Unanticipated implementation changes decrease in frequency when detailed  
12 site conditions are known, but there is always the potential for change in the plan due to  
13 construction delays, permitting glitches, or any number of other situations that can arise.

14 The potential for problems to arise is even greater on this project because the amount of  
15 baseline detail presented by Olympic on geology, wetlands, groundwater, surface water drainage,  
16 wildlife use, and riparian corridor conditions is minimal. It is therefore likely that many unforeseen  
17 problems may arise.

18 Additionally, the site conditions encountered for geology, soils, hydrology, vegetation, and  
19 wildlife vary widely along the length of the pipeline because of the different geologic and climatic  
20 zones that are encountered from Snohomish County to Pasco. It is difficult to anticipate problems  
21 that could arise under so many different combinations of topography, soils, geology, rainfall, and  
22 vegetation. This is especially true given the lack of detailed mitigation and construction detail that  
23 has been provided to-date.

**Q. 1** You testified earlier that the applicant failed to identify the indirect impacts from  
2 construction and operation of the pipeline. What are the differences between a direct and an  
3 indirect impact?

**A. 4** As discussed above, direct impacts affect vegetation through activities that cause direct damage to  
5 plants. These include clearing, cutting, pruning, contamination with a toxicant, and in general  
6 damaging the plants. Direct impacts to wildlife include mortality due to direct blows (e.g., running  
7 over with equipment) or contact with a toxicant, such as oil.

8 Indirect impacts lead to plant and animal mortality, but the cause is changes to a third  
9 factor, which in turn affects the plants or animals. An example is habitat disruption (e.g., clearing  
10 or pipeline ROW maintenance) that results in loss of food or shelter for wildlife, causing the  
11 animals to die. Disruption of surface drainage that results in part of the wetland drying out can  
12 cause the plants to die.

13

**Q14** Is one type of impact necessarily more significant than the other?

**A.15** No. Both direct and indirect impacts can result in plant and animal mortality, so both are  
16 significant. Both can result in habitat loss or habitat alteration, neither is more significant. Indirect  
17 impacts are often more difficult to identify or quantify, but that does not mean they are not  
18 important.

19

**Q20** In your opinion, should the 1,000 acres of wetlands that will be influenced by the pipeline  
21 passing through the wetland or its associated buffer be included in the summary of  
22 anticipated project impacts?

**A.23** Absolutely. All areas adjacent to the pipeline route should be considered for potential impact.  
24 Indirect impacts in areas outside of the 60-foot corridor should be considered. Disturbance to the  
25 buffer areas both inside the 60-foot impact area and also within the 200-foot influence zone can  
26 result in indirect impacts to wetlands area. Upland buffers are adjacent to wetlands and have soils,

1 hydrology, and vegetation that are not influenced by inundation or soil saturation. Buffers perform  
2 many functions that result in protection of wetlands. Buffer functions include the following:  
3 reducing sediment loading that enters the wetland from upland areas, preventing soil erosion  
4 (especially in riparian areas), providing habitat for wetland-associated wildlife that spends some of  
5 its life cycle in upland areas, providing visual and noise screening for wildlife in the wetland, and  
6 filtering surface water flows to improve water quality of waters entering the wetland (Mulamootil  
7 et al. 1994).

8 Previously unidentified wetlands and riparian corridors identified by George Wooten need to  
9 be considered. Some are within the 60-foot direct impact area and some are within the 200-foot  
10 influence corridor.

11  
12 **Q. What is necessary to reduce changes in wetland hydrology as a result of project**  
13 **construction?**

14 **A.** Two surface drainage manuals in the State of Washington recommended that surface  
15 drainage design minimize hydrologic changes to within a narrow percentage of pre-development  
16 conditions. These are the King County Surface Water Design Manual (1997), and the Washington  
17 State Department of Ecology Stormwater Management Manual for the Puget Sound basin (1992).  
18 Most jurisdictions around the State require or recommend the use of one of these manuals for  
19 surface drainage design for construction projects. A design based on the specifications outlined in  
20 either manual helps to maintain the pre-development hydrology. This is necessary if the plants  
21 (and as a result, wildlife) are to remain as they were before the installation of the pipeline.

22 The trench installation procedure discussed in the pipeline DEIS could cause an alteration  
23 of both surface and shallow groundwater flows despite the statements to the contrary (King County  
24 1997). Interruption of soil structure alone would cause a disruption of shallow groundwater flow  
25 and surface drainage characteristics. Installation of a pipeline through the excavation of a trench  
26

1 would also obviously disrupt groundwater flows and could potentially provide the equivalent of a  
2 drainage ditch for conveying surface and groundwater flows away from a wetland (King County,  
3 1997, WSDOE 1992).

4  
5 **Q. Will construction of the pipeline cause permanent, as well as temporary, impacts?**

6 **A.** Yes, installation of the pipeline across wetlands will incur permanent impacts that need  
7 to be mitigated. The applicant's statement that the impacts from the pipeline will be temporary is  
8 misleading. The impacts will not be temporary, because the ground water hydrology and soil  
9 structure will be irrevocably changed as a result of the excavation of the pipeline. Wetland impacts  
10 do not occur simply as a result of fill. Excavation can disrupt the groundwater hydrology or disturb  
11 impervious layers and drain wetland areas. Constructing berms on which to rest pipelines can  
12 cause disruption of surface hydrology and effectively drain wetlands. Following completion of  
13 construction and temporary disturbances to wetlands, OPL proposes to "return" the areas to pre-  
14 construction conditions to avoid allowing non-indigenous invasive plants to thrive, which would  
15 restrict the growth of native vegetation in compacted soils. Even if it is replanted, removing  
16 vegetation can adversely affect the wetland community; weedy species are introduced that may  
17 later overwhelm the native plants.

18 Because wetlands will incur permanent impacts, local jurisdictional requirements for  
19 mitigation would be required in addition to restoration. This is because it cannot be assumed that  
20 restoration will succeed or that the jurisdictional agencies will not consider the impact even if it is  
21 "temporary."

22  
23 **Q. In your opinion does burying the pipeline in existing rights of way result in a**  
24 **reduction of impacts to wetlands?**

25 **A.** No. Throughout the Application, there is an assumption that impacts will be limited just  
26

1 because the pipeline will follow the existing right-of-way (ROW) for much of the alignment. This  
2 assumption implies that since most of the wetlands are located within the BPA right-of-way, they  
3 are all low value, or at least very disturbed, and therefore not worthy of protection. The  
4 assumption is in error, because there are many wetlands, seasonal creeks, stream, and river  
5 corridors within the right-of-way. Further, before the value of wetlands was fully appreciated, it  
6 was common to site rights-of-way through wetlands. This does not mean that the impact to  
7 wetlands has been reduced.

8 Burial of the pipeline can, and in most cases will, not only disturb the vegetation, but also  
9 disrupt the surface and shallow groundwater hydrology within impacted wetlands. Removing or  
10 cutting vegetation may not be as potentially damaging to the wetland as excavating soil and  
11 burying the pipeline, because a pipeline sitting on the surface may avoid hydrologic impacts.

12 It should also be remembered that the right-of-way easements are continually maintained.  
13 Access vehicles may enter these areas to repair or maintain utility towers. The act of maintenance  
14 does impact these areas through the following:

- 15 • altering the hydrology by rutting the soil surface
- 16 • digging drainage ditches to convey water away from the ROW
- 17 • cutting trees and pruning trees and shrubs
- 18 • mowing ROW access lanes
- 19 • increasing disturbance, which affords weedy species to access the areas and take  
20 hold at the expense of the natural vegetation community.

21 **Q. What types of impacts would be created by an oil spill into a wetland during**  
22 **pipeline operation?**

23 **A.** Although the pipeline application and DEIS documents barely discussed impacts or  
24 stated there would be no impact, impacts from a petroleum product spill to a wetland would  
25 certainly involve both direct and indirect effects to the plants and wildlife located in wetlands  
26 along the proposed pipeline route.

1 The literature regarding impacts of oil spills on freshwater vegetation indicate that plant  
2 mortality, a decrease in total plant cover, and a shift in individual species dominance occur as a  
3 result of oil contamination (Burk 1977, Gosnell 1992, Catallo 1993). Additionally, high marsh  
4 species showed an immediate effect that lasted a minimum of four years, while low marsh species  
5 showed little initial effect but displayed marked effects (declined aerial cover and shift in species  
6 dominance to weedy plants) over time (Burk 1977). Measured toxic effects to vegetation can  
7 include killing of young shoots and seeds, altered metabolic and physiological functioning  
8 (photosynthesis, respiration, translocation, transpiration). (Teal and Howarth 1984, Bender et al.  
9 1981).

10 An oil spill would have direct effects on wetland-associated wildlife. Indirect impacts  
11 would affect the soils and water that would in turn affects the plants and wildlife. The indirect  
12 effects on wildlife due to changes in vegetation caused by an oil spill would depend on the degree  
13 of vegetation changes and wildlife use of the vegetation that is affected. The impact could  
14 obviously be great.

15 Washington State recognizes oil spill-induced impacts to wildlife and habitats in its  
16 Compensation Schedule for wetlands, WAC 173-183. This recognition by the State should  
17 provide ample evidence that the impacts from a spill should be addressed in both the application  
18 and the DEIS, and contingency actions should be developed.

19  
20 **Q. How do you measure the success of wetland restoration?**

21 **A.** Most agencies in the Puget trough (e.g., King County, Snohomish County) require that  
22 not more than 15 percent of the vegetation found in the mitigation areas (areas restored, enhanced  
23 or created) can be composed of invasive species listed in the Washington State Department of  
24 Ecology's Wetland Classification protocol (WSDOE 1993). Restoration performance standards  
25 should be specified after one and five years, except in forested wetlands, in which a minimum of  
26 ten years is necessary to establish performance standards. (King County, Snohomish County, US

1 Army Corps of Engineers, Seattle District). It would be difficult for the restorations discussed in  
2 the pipeline application to achieve the stated "...at least 80% of total cover in wetland, buffer, and  
3 riparian vegetation," given the following limitations:

- 4 • lack of pre-disturbance site characterization information for each wetland area to  
5 be impacted,
- 6 • lack of individualized wetland mitigation plans for each wetland impact, and
- 7 • lack of defined maintenance of the mitigation areas after installation.

8  
9 **Q. What has been your experience regarding attempts to restore wetlands following**  
10 **construction?**

11 **A.** Contrary to OPL's assertions that wetland restoration is simple, restoration of wetlands  
12 following construction is difficult and not always successful. The DEIS states that scrub-shrub and  
13 emergent wetland crossings can "...easily be reestablished through revegetation." DEIS, p. 3-72. I  
14 can neither readily find support for this in the literature nor in my experience with mitigation  
15 projects in the state. The restoration of wetlands post-installation will not necessarily guarantee  
16 replacement of the pre-construction wetland habitats. Compaction of soils during pipeline  
17 installation will occur, altering the hydrologic regime and soil structure. Removal of the tree  
18 canopy will change the light regime, and clearing the existing vegetation will allow for the  
19 introduction of exotic invasive species into the wetland areas.

20 The most prevalent category of wetlands located along the pipeline route in western  
21 Washington is Category I (highest value) according to criteria in the *Washington State Wetlands*  
22 *Rating System for Western Washington* (WSDOE 1993). Generally, Category I wetlands have  
23 irreplaceable functions, so replacing or restoring these functions may not be possible. These are  
24 predominantly forested wetlands, which are likely to convert to emergent and scrub-shrub types  
25 after the pipeline is installed. Although the project summary states there will be no maintenance in  
26 wetland areas along the pipeline route, it will be difficult to maintain a no-work zone in 23 acres

1 (reduced to 17 acres in the revised application, and again to less than 15 acres) of restored wetland  
2 with maintenance crews that change over time. Post-installation disturbance from maintenance  
3 activity will most likely allow exotic weedy species to grow in the restored wetlands along the  
4 route.

5 The DEIS states that "...vegetation removed for construction would be replanted with  
6 native wetland species common to the wetland." DEIS, p.3-71. It is my understanding that the  
7 Applicant intends to maintain cleared corridors through forested wetlands. Because different  
8 wetland vegetation may be planted over the pipeline, the value of the wetland would be changed  
9 due to the loss of trees. In areas where trees are planted, it will take a number of years before  
10 planted trees attain the size of trees removed along the route, and replace the pre-project value of  
11 the altered wetlands. Only WDFW-approved plants should be used for re-vegetation. Locally  
12 adapted stocks will provide the best opportunity for successful re-vegetation.

13  
14 **Q. Where impacts to wetlands cannot be avoided, there is a requirement that the**  
15 **applicant replace the impacted wetlands or enhance other wetlands as compensatory**  
16 **mitigation. In your opinion, what are appropriate ratios for compensatory mitigation?**

17 **A.** Mitigation ratios by wetland class as recommended by WSDOE, WSFWS, and King  
18 County are as follows (Washington State Department of Ecology 1990. Model Wetlands  
19 Protection Ordinance):

- 20 • Category I: 6:1 replacement ratio for wetland impacts
- 21 • Category II or III:
  - 22 Forested: 3:1 replacement ratio for wetland impacts
  - 23 Scrub-shrub: 2:1 replacement ratio for wetland impacts
  - 24 Emergent: 1.5:1 replacement ratio for wetland impacts
- 25 • Category IV: 1.25:1 replacement ratio for wetland impacts

26 Mitigation ratios should be increased beyond the standard recommended ratios under the  
following circumstances:

- Success of the mitigation is uncertain (which it is, given the lack of detail known for individual sites, the failure to have individualized mitigation plans developed and failure to provide evidence that monitoring and maintenance will occur for each mitigation site.)
- A significant period of time elapses between impacts and full mitigation, and/or
- The mitigation is off site (which it may be, given the linear nature of the project and the huge area the project covers.)

As discussed above, many of the wetlands west of the Cascades that are slated to be impacted are forested, Category I systems, and should therefore be mitigated at a minimum ratio of 6:1.

Mitigation ratios may be decreased if special studies coordinated with agency staff with expertise demonstrate that no net loss of wetland function or value is attained with the decreased ratio. Mitigation ratios are based on Ecology's Wetlands Policy (POL-3025), and Washington's Governor's Executive Order 90-4, and the following:

Mitigation of wetland impacts will usually require an area ratio that is greater than 1:1 to ensure that there is full replacement of both wetland area and functions. The regulatory agencies are using this approach because the existing information and scientific consensus indicate that there are major losses in wetland function over the time it takes for mitigation wetlands to become a fully functioning part of the ecosystem (at least 30-50 years). The extra area is used to compensate for the loss of these functions. Furthermore, reviews of mitigation projects have found a significant failure in current mitigation projects. The success rate is less than 50 percent and a large percentage of mitigation projects fail to meet the goal of "no net loss" of either wetland area or function. Mitigation ratios are negotiable and will be based on the functions being replaced and the risks involved with the proposed mitigation.

Washington State Departments of Ecology, Fisheries, and Wildlife; U.S Environmental Protection Agency, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service. March 1994. Guidelines for Developing Freshwater Wetlands Mitigation Plans and Proposals.

**Q. Has the applicant provided adequate information regarding compensatory mitigation for impacts that cannot be avoided?**

**A.** No. The pipeline application states that degraded wetlands at four selected sites would

1 be enhanced to further compensate for wetland impacts, but it does not provide details on where  
2 that mitigation will be performed. In order to evaluate the effectiveness of OPL's wetland  
3 mitigation proposal, we need to review the details of where the mitigation will be conducted, how  
4 the mitigation sites were selected, what type of wetland mitigation will be provided, etc. OPL does  
5 not state the criteria for determining that 14.5 acres of wetland enhancement will be sufficient to  
6 offset impacts. The applicant's wetland mitigation plan should be reviewed at the same level of  
7 detail as that required for projects being reviewed for an individual water quality certification by  
8 Ecology. The necessary level of detail is outlined in a multiagency document titled *Guidelines for*  
9 *Developing Freshwater Wetlands Mitigation Plans and Proposals* (Ecology Publication No. 94-29,  
10 available on Ecology's website).

11 The Compensation section of the application is inaccurate and misleading. There is no  
12 justification for the statement that forested areas along the pipeline will be compensated for by  
13 converting them to shrub and/or herbaceous plant communities. Although it is true that wetland  
14 mitigation will compensate partially for the loss of habitat, shrubs and herbs will not compensate  
15 for the loss of forested habitat. This downgrading of habitat will need to be mitigated for by either  
16 setting a higher mitigation ratio or creating forested wetland habitat away from the pipeline impact  
17 area. Even with mitigation, trees do not grow overnight. It will take some time for the trees that  
18 are lost to grow elsewhere, and the creation of new edge habitat through the existing wetlands will  
19 diminish the habitat values of the existing wetlands.

20 OPL does not indicate what criteria were used to determine that a 2:1 enhancement ratio is  
21 sufficient to mitigate for impacts to forested wetlands. Were impacts at each crossing evaluated  
22 individually, or was this ratio established for the project as a whole? This ratio is significantly  
23 lower than ratios determined by Ecology to achieve no net loss of wetland functions and values.  
24 Ecology's approach with the establishment of project-specific mitigation ratios is discussed in two  
25 Ecology publications: "How Ecology Regulates Wetlands" (Publication No. 97-112) and "Wetland  
26 Mitigation Replacement Ratios: Defining Equivalency" (Publication No. 92-08).

1 **Q. In your opinion, has the Applicant adequately identified the mitigation necessary to**  
2 **address project impacts to wetlands?**

3 **A.** No. The Mitigation Measures section of the Application is not sufficient for a potential  
4 total impact of 1,000 acres. It is essential to discuss in detail, by impact site, how the areas will be  
5 restored, enhanced or created. No mitigation plan has been proposed, and the size of the project  
6 means there will be little monitoring or maintenance of impacted and restored areas, so the  
7 likelihood of success of the restoration is small. There is a danger that no substantial mitigating  
8 measures for individual sections of the pipeline will be done.

9 Each section of the pipeline should have a mitigation plan spelled out in a manual, so that  
10 individual contractors know exactly what needs to be done. It is standard in the field to present, at  
11 the very minimum, a conceptual mitigation plan and report for each and every area that is to be  
12 restored, enhanced or created. For example: "Section X 500 feet along Sample Creek must have  
13 175 feet of silt apron fencing installed according to the Washington State Department of Ecology  
14 methods from Location Y to Location Z. In addition, organic mulch must be placed over the  
15 buried pipeline and then hydroseeded to prevent erosion, and hay bales must be placed to the side  
16 which drains along the drainage swale for 80 feet upstream of the Creek to prevent siltation. This  
17 work can be done only from July 15 through August. The silt apron will be removed by April 15th  
18 of the next year."

19 The recommendations in the application are too general, and they will not be reviewed by  
20 the contractors who are actually doing the work, because they are not in a format that could be sent  
21 out to bid. Conceptual mitigation plans for each area to be restored, enhanced or created must be  
22 completed prior to EFSEC approval.

23  
24 **Q. In your opinion, what additional mitigation measures besides those proposed by**  
25 **the applicant should be required?**

26 **A.** The mitigating measures listed in the DEIS, p. 3-78 and 3-79 and Appendix C, are

1 measures that OPL should be required to integrate into the project design. The mitigation proposal  
2 currently addresses only 15 acres of permanent wetland and riparian impact along the entire  
3 pipeline route. The proposal fails to address or discuss mitigation for indirect wetland impacts that  
4 will result in wetland loss, and additional unidentified wetlands that may be encountered along the  
5 route. Some wetland and riparian areas within the pipeline route zone of influence have not been  
6 identified. The pipeline, if installed as currently designed, will impact the wetlands in these  
7 additional areas, requiring additional mitigation. (Application 3.4-30.)

8  
9 **Q. In your experience, what is the range of mitigation costs for projects that impact**  
10 **wetlands?**

11 **A.** Mitigation costs vary depending on individual site conditions for topography, soil,  
12 vegetation, and hydrology. The least expensive is approximately \$3.00 per square foot and the  
13 upper end of mitigation costs would be \$7.00 per square foot. A site where no grading needs to be  
14 done and hydrology is already present would present costs in the lower part of the range. For 14.5  
15 acres of wetlands, the range would be \$1,894,860 to \$4,421,340; for 1,000 acres of wetlands, the  
16 range would be \$130,680,000 to \$304,920,000.

17  
18 **Q. What are the qualifications you consider necessary for a person to act as a “trained**  
19 **inspector” on-site during construction?**

20 **A.** A qualified wetland ecologist and/or wetland habitat mitigation designer, certified as a  
21 Professional Wetland Scientist by the Society of Wetland Scientists should be present during the  
22 entire pipeline installation to insure the following:

- 23
- 24 • no new (non-inventoried or previously identified) wetlands are encountered and  
25 impacted, or if encountered, they are delineated, characterized, and additional  
26 mitigation is developed to accommodate the additional acreage;
  - the pipeline installation is done according to the most environmentally sensitive  
methods available;

- the area of impact is no more than the narrow corridor described in the application, and if more area is impacted that the additional mitigation is developed to accommodate the additional acreage;
- wetland and riparian corridor areas are restored according to whatever mitigation plans have been approved; and
- all unanticipated environmental problems are dealt with by an ecologist and not by the backhoe operator.

**Q. What authority must the inspector have to be an effective monitor to prevent impacts during construction?**

**A.** An agency-hired wetland and stream installation inspector, who has authority to shut down operations in case of severe problems with the installation, should be used for the inspections. This is necessary to prevent catastrophic problems from worsening should the pipeline installation contractor ignore the recommendations of a pipeline-hired consultant in order to stay on schedule. Additionally, a hydrogeologist should be on call should slope failures or groundwater problems arise as a result of the excavation of the pipeline trench.

**Q. In your opinion has the Applicant sited the pipeline to avoid or minimize impacts to wetlands?**

**A.** No. A number of routing alternatives and construction alternatives that would reduce impacts to wetlands are available, but have not been discussed in the Application or the DEIS. "These alternatives are all technically feasible, economically viable, avoid invasive crossings of streams, reduce direct impact to wetlands, and meet the stated purpose and need. Because these alternatives will reduce direct impacts to wetlands and avoid invasive crossings of streams without significantly increasing project costs, these alternatives should also be considered in detail." Exh. SSC-3, King County's Comments on DEIS, p. 19-31.

1 I have reviewed the alternative route proposed by King County for the pipeline within the  
2 County boundaries and agree that this alternative is preferable to the route proposed by the  
3 applicant.

4  
5 **Q. In addition to King County wetlands, are there wetlands along the route that you**  
6 **are especially concerned about?**

7 **A.** Yes. From my review of the Application and the DEIS, and through consultation with  
8 other wetlands biologists and the two day site visit, I have particular concerns about the following  
9 wetlands.

10 The wetland crossings associated with the following stream crossings will need to be site  
11 specific in design to minimize construction impacts: (# 's are associate with crossings along the  
12 route)

13 Little Creek (#129)  
14 Spex Arth Creek (#132)  
15 Tillman Creek (#133, 134)  
16 Thornton Creek (#143)  
17 unnamed stream (#148)  
18 Swauk Creek (#151, 152)  
19 Dry Creek (#156)  
20 unnamed streams (#164, 165)  
21 Jones Creek (#168-170)  
22 Currier Creek (#178-180)  
23 unnamed creek (#186)  
24 Wilson Creek (#187)  
25 Naneum Creek (#190-193)  
26 Coleman Creek (#196)  
Parke Creek (#204, 206)  
Tolt Creek (unknown)

27 The wetland at mile 65.7 is important, because it is a mature forested system with a  
28 hydrologic regime that would be highly susceptible to permanent impacts from pipeline  
29 installation. All options for avoiding this wetland should be considered and maximum efforts  
30 taken to restore all wetland functions if the wetland is disturbed.

Design of the wetland crossings at miles 84 to 85.5, 96.2, and 96.3 will need to be site-specific to minimize construction impacts.

The Cook Creek crossing (#199) also has a wetland that is significant because of its size and complex habitat structure. This location has the potential for being a difficult crossing due to water and mud.

A very high quality wetland exists at mile 158.35-.06. The pipeline should be moved north approximately 1250 feet to avoid this wetland.

The wetland at mile 179.0 crosses the Royal Wasteway, not Crab Creek as indicated in the atlas. This is a very high quality wetland that needs special attention.

The wetland at mile 179.6 is very important, because it is high quality and important for shore bird nesting (avocets and black necked stilts). The most sensitive time for nesting is April through June. Sandhill cranes also roost and stage here for migration in March and April. Another known sandhill crane area occurs at Pipeline Mile 181.5. (p. 3-68. Please note that the sandhill crane is not an upland bird.) The atlas indicates the preferred route does not go through this area, but is adjacent to it. Disturbance should be avoided by timing construction appropriately.

Miles 199-200 (Bailie Ranch): This area is characterized by very good wetlands and riparian habitat. It will require extra attention to avoid or minimize construction effects; and calls for extra care in post-construction restoration.

Miles 202.5-231: This area requires attention and care to avoid or minimize construction impacts on features such as wetlands, wet spots, and ditches, which provide bird and small mammal habitat.

**Q. To sum up, in your opinion has the applicant provided sufficient information regarding the impacts to wetlands to allow EFSEC to make an informed decision on site certification?**

**A.** No. The information provided on wetlands, streams, and riparian corridors in the

1 Application and DEIS is insufficient for the following reasons:

- 2 • It fails to identify and delineate the true extent of all the wetlands along the route.
- 3 • It fails to identify the true extent of the impact zone of the pipeline installation.
- 4 • It fails to adequately characterize the hydrology, soils, vegetation, and wildlife of each wetland along the route.
- 5 • It fails to describe the individual functions and their performance for each wetland along the route so that compensatory mitigation can be designed.
- 6 • It fails to sufficiently describe impacts in order to accurately understand both direct and indirect disturbances to each wetland and associated buffers.
- 7 • It fails to describe detailed mitigation that would be offered for each impact proposed along the route.
- 8 • It fails to consider the impacts of an oil spill from a pipeline leak or rupture on wetlands within the impact zone and near the impact zone.

9 The amount and level of detail offered at this point in time is sorely insufficient for the  
10 Council to be able to determine the true amount and level of impact that will occur as a result of  
11 the installation and operation of an oil pipeline. The required information is available through  
12 standard accepted evaluation procedures and OPL has failed to collect the data and perform the  
13 required impact and restoration analysis that *all* jurisdictions (local, state, and federal) require.  
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